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An accelerated program for superior high school students was described. The experimental program was offered to students who had completed three years in the St. Paul Developmental Program. They were enrolled in regular science or math courses at Hamline University while still completing their final year at their respective high schools.

The purposes of the experiment were to determine if selected high school students could complete and receive credit for such a college course while maintaining other high school activities satisfactorily, to determine if such a program would be advantageous to the students in their college work, and to determine the effect of the plan on other high school students not involved. The majority of the students completed their courses successfully. Significant decisions affecting their future educational plans resulted. The program apparently had no effect on nonparticipating high school students.

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The Hamline University Class Plan For St. Paul Developmental Program Students

a report of a three-year experiment in college classes for talented high school students in mathematics and sciences

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Dr. Olaf Runquist
Director
Hamline University

THE HAMLINE UNIVERSITY CLASS PLAN FOR SAINT PAUL DEVELOPMENTAL PROGRAM STUDENTS[1]

An Experiment in College Classes for Talented High School Students in Mathematics and Science.

Final Report
Olaf Runquist
Hamline University

[1] A report on the Developmental Program may be obtained from Mr. Clyde Manchester, Foundation Consultant, Mechanic Arts High School, St. Paul 1, Minnesota.

This Report Is Presented to You
with the Compliments of the
Louis W. and Maud Hill Family Foundation
and
Hamline University

PREFACE

This report is an attempt to bring together all pertinent information relating to the Hamline University Class Plan Program and to discuss the significance of the results obtained. The reader should bear in mind that a rather limited number of Developmental (D) students were involved in this experiment (52) so that percentage figures are significant only for showing trends. Student attitudes, which are included in the report, are a result of both personal interviews and questionnaires. The comments, criticisms and conclusions included in the report are those of the author and are not necessarily those of the science division at Hamline University.

This experiment was carried out with complete independence from the Hill Family Foundation, Hamline University and the St. Paul School system, but we gratefully acknowledge the assistance we received from these three organizations. We are especially indebted to Mrs. Mary Pilch, whose foresight and effort was so important to the establishment of the Developmental Program in the St. Paul schools and who was of such great help to us in planning and executing the Hamline University Class Plan. We also wish to thank Mr. Clyde Manchester, Foundation Consultant for the St. Paul school system, Mr. Dean Trampe, Director of Admissions, Hamline University, and the numerous high school principals, counselors and teachers for their help in selecting students.

Special recognition is due the Louis W. and Maud Hill Family Foundation for their financial and moral assistance, without which the program could not have been established.

Most of the success of this project, however, is due to the teaching efforts of my colleagues at Hamline, Dr. Walter Fleming, Dr. Dale Varberg,

Mr. Gary Anderson and Mrs. Erna Yackel of the Mathematics Department; Dr. Kent Bracewell of the Physics Department; Dr. Walter Kenyon and Mr. Bert Hawkins of the Biology Department and to the many devoted and talented high school teachers in the St. Paul Developmental Program.

* * * *

PART I

GENERAL DESCRIPTION OF THE HAMLINE UNIVERSITY CLASS PLAN

The Hamline University Class Plan is an experimental program sponsored by the Louis W. and Maud Hill Family Foundation and carried on in conjunction with the St. Paul Developmental Program. Under this plan up to twenty high school students, who had completed three years in the St. Paul Developmental program, enrolled in a regular college science or mathematics course at Hamline University. The students continued their other pre-college training at their respective high schools. Each student received full college credit for successful completion of his "Class Plan" course.

The purpose of the experiment was threefold: (1) to determine if selected high school students from the Developmental Program could successfully complete a college course in science or mathematics while maintaining other high school activities at a satisfactory level; (2) to determine if such a program would be advantageous to the students in their college work in regard to (a) the number that would use the college credit earned toward a degree, (b) the level of competence the students maintained in the first college class in which the Class Plan course served as a prerequisite and (c) the level of interest and motivation in science and mathematics which the students generally maintained; (3) to determine the effect of the "Class Plan"on high school students not involved.

The students participating in the experiment were selected by a committee of five from Hamline University on the basis of (a) recommendations from counselors, program coordinators and appropriate high school instructors, and (b) the student's record (including at least 12 full year courses) from the 9th through the 11th grades. Specific criteria which were necessary for admission to the program were (a) an unweighted high school rank at the end of the junior year of 80 percentile or better, (b) enrollment in the Developmental Program for three years, (c) a rank of 80 percentile or better on the Minnesota Scholastic Aptitude Test (or an equivalent test), (d) a score of 60 or better on the Preliminary Scholastic Aptitude test (if taken) and (e) that the student be strongly motivated, intensely serious about his education, and be a willing and capable worker.

Each high school student, while on the Hamline University Campus was considered a regular matriculated college student enrolled in a single college course. As such, he attended the regular college class (composed of at least 50 percent full-time college freshmen), was held responsible for all laboratory and class assignments and was graded on the same basis as the regular college students. The "D" students had a college counselor (the program director), were given full use of the campus facilities and were provided activity books for the college cultural, social and athletic events. As it was important that the "Class Plan" experiment be as constructive an experience for the student as possible, the following "drop" procedures were observed: (a) a student whom the college instructor felt could no longer benefit by the college course was returned to his regular high school class, (b) a student completing, but failing the college class was given high school, but not college credit for the course and the failing mark did not

appear on the student's permanent college record and (c) grades and credits earned were transferred to the student's permanent college record only upon his request.

The courses available in the program were General Biology, General Botany, General Chemistry, Astronomy-Geology, General Physics and Mathematical Analysis-Calculus.

Hamline University grants advanced placement to well-prepared entering freshmen on the basis of a written examination or courses taken before entering college. Because of the nature of the St. Paul Developmental Program, all of the high school students selecting mathematics were given one semester of advanced standing. These students enrolled in the "advanced placement" section of the mathematics course, began with the second semester freshman mathematics and continued with a semester of sophomore mathematics. The students enrolling in botany, biology, physics, chemistry or astronomy-geology were not given advanced placement standing.

PART II

PROCEDURES

A. Selection and Orientation of Students:

In the spring preceding the enrollment of "D" students in "Class Plan" courses, information regarding the science and mathematics courses available and the schedule of these classes was sent to Mr. Clyde Manchester, who, in turn, sent this information, along with application blanks, to counselors at the St. Paul schools participating in the "D" program. Students selected by teachers and counselors filled out the application form (Form I). This application was completed by the student's teacher(s) and counselor and sent, along with the student's high school academic record, to the Admissions Office at Hamline University. The scores of achievement and aptitude tests were provided by the high school or the Foundation Consultant's office.

Four members of the Hamline University Science Division and the Hamline University Admissions Counselor selected the students whose scores and recommendations by teachers and counselors indicated probable success in the "Class Plan" course.

A letter (Form II) was sent to each student selected for participation and the student returned a data sheet (Form III) indicating in more detail his personal background and his academic plans.

During the summer preceding enrollment in the "Class Plan", students were asked to meet with the director of the program on the Hamline University Campus. At this time the purpose of the experiment was explained, the procedures of a college class, and the level of competence expected of college students was discussed. (This "briefing session" was essentially the same

FORM I

APPLICATION

On-Campus College Program

Name _____ Age ____ Parents name _____
Last First Middle

Address _____

Course you wish to register for _____

Reason for taking this course _____

_____

List your present vocational choices 1. _____ 2. _____ 3. _____

Check the course in which you have done your best work:

Physics _____ Chemistry _____ Biology _____ Mathematics _____

Check the course in which you have done your poorest work:

Physics _____ Chemistry _____ Biology _____ Mathematics _____

List the extra-curricular activities in which you have participated in high school.

_____

* * * * * *

TEACHERS RECOMMENDATIONS (Teacher in area of subject for which this student desires to register). Please check the following:

	Superior	Above Average	Average
Competitiveness	_____	_____	_____
Reaction to pressure	_____	_____	_____
Realiability	_____	_____	_____
Deportment	_____	_____	_____
Motivation (for subject)	_____	_____	_____
Aptitude (for subject)	_____	_____	_____
Ambition	_____	_____	_____
Attendance	_____	_____	_____

COUNSELOR'S RECOMMENTATION:

Do you recommend this student for the On-Campus College Program? Yes____ No____

FORM II

Date

Dear

Your high school record and the results of scholastic aptitude and achievement tests have been considered, and I have the pleasure of informing you that you have been accepted for the "on-campus course" of the Student Developmental Program. Hamline University is pleased to have you in attendance, and extends its congratulations on the recognition given you.

The cost of the program is being borne by Hamline University through a grant by the Hill Family Foundation. Tuition and all fees are covered under this arrangement. In addition, the grant makes a provision for compensating you for your travel expenses from your high school to Hamline University and return. All text books that are necessary will be supplied by the Student Developmental Program.

I believe you already have a copy of our 1960-62 catalog. The class schedule and announcements for 1960-61 will be mailed to you in August.

We intend to invite your parents to a meeting early in the fall when we can answer their questions and acquaint them with some of the objectives of the "on-campus" program.

Once again, let me welcome you to our campus and to our classrooms.

Sincerely,

Director of Admissions

t:n

HAMLINE UNIVERSITY ON-CAMPUS COURSE PLAN

DATA SHEET ST. PAUL STUDENT DEVELOPMENTAL PROGRAM
fill out two copies

Name _____ Date _____

Address _____ Zone _____ Tel. No. _____

High School _____
Name of
Parents or guardians _____

Address, if different _____

Birthdate _____ Male ___ Female ___ Height _____ Weight _____

Father's occupation _____ Mother's occupation _____

Name of Counselor _____

Name of Principal _____

What course do you intend to take on the Hamline campus? _____

What course of study are you intending to follow in college? _____

List your present vocational preferences in order of choice:

1. _____ 2. _____ 3. _____

What was or is your favorite subject or class in high school? _____

What was the subject you liked the least? _____

What subject or class was the most difficult for you? _____

Mention any co-curricular activities in which you have an interest. _____

_____

_____

List names and ages of brothers and sisters. If now in college, give the name of the college. _____

_____

_____

_____

as given all entering freshmen at Hamline.) At this orientation session the problems of scheduling classes and study time were discussed with the student. All students attended these sessions.

A rather lengthy letter (Form IV) was sent to the parents of each student planning to participate in the program. This letter explained in considerable detail the experiment and the procedures that would be followed. Soon after the school year had started, all parents were invited to Hamline for a further orientation session, at which time they had the opportunity to meet the Hamline teachers involved in the program and ask questions about the experiment.

The scheduling of classes for the students was finalized during the summer preceding "Class Plan" enrollment by the "Class Plan" Director and the high school counselors. Two weeks before college classes started, a letter (Form V) was sent to each student who was able to schedule a class. This letter contained information about books, registration, the first class meeting and new student day activities.

The "D" students registered with the regular college students and became eligible to use all student facilities at Hamline and to participate in all campus activities.

B. Obtaining Data:

We were interested in obtaining the following information about the "D" students participating in the "Class Plan" experiment:

a. An indication of their academic accomplishments and capabilities: For this we used the student's high school rank, MSAT score, and SAT scores.

Dear Mr. and Mrs.

I would like to congratulate you and your (son) on (his) selection to the Hamline University Class Plan for next year. This selection, made on the basis of ability and interests, is a real credit to your (son's) ability and we feel the program will offer a real opportunity for growth as well as providing a "head start" for (his) college career.

Because this is an experimental program, I though I should explain our plan in some detail to you.

The Purpose:

The Hamline University Class Plan was designed and initiated by the Hamline University Science Faculty with the cooperation of Mrs. Mary Pilch, Foundation Consultant to the St. Paul public schools and is underwritten by the Hill Family Foundation. This program is basically an experiment designed to answer certain questions about the St. Paul Developmental Program, particularly, and about college programs for high school students in general. Two questions which we hope to be able to answer at the end of this experiment are: (1) is it possible for high ability high school seniors to successfully complete a college course in science or mathematics while maintaining their high school courses and activities at a satisfactory level and (2) determine the value of such a college course to the student in his future college career, (that is, will this course prove to be a satisfactory prerequisite for his other science and mathematics courses and will it tend to stimulate or kill his interest in science and mathematics).

In order to accomplish the purpose of the experiment, it will be necessary to place the high school student in a class (1) that is designed for college students, (2) in which examinations and grading are at the college level and (3) in which discussions are carried on with and by college students.

Administration of the Program:

The students selected for this experiment will come to the Hamline University campus and become regular members of a science or mathematics class and then return to their high school for the remainder of their courses. Each student will be enrolled in one course only -- biology, chemistry, mathematics, physics, or astronomy-geology -- depending upon his ability and interest. These students will be tested and graded along with the regular college students and will receive full college credit for the successful completion of the course. The college credit earned may be transferred to the student's permanent college record if he so desires.

We hope that the answers to the questions for which this program was designed to answer will come from the student's academic achievements and interviews with the students and their Hamline University and high school teachers during the college year. A follow-up study of the students will be made one year after the end of the experiment.

While your (son) is on the Hamline University campus he will be considered a full-fledged college student in that he will have to maintain the same standards as the regular college people. We do not, however, want this to be an undesirable experience for (him) and have, therefore, "built in" some special features for (his) program.

1. (His) college teacher will know that (he) is a special "high school" student and will keep in close contact with me as to (his) progress and any difficulty that (he) might have.

2. I will be (his) counselor at Hamline and will be keeping close watch of his work and talking with him frequently.

3. Should (he) find the college class too difficult at this time, the following procedures will be observed:

   a. a student whom the college instructor feels can no longer benefit by the college course will be returned to his regular high school class.

   b. a student completing, but failing the college class will be given high school, but not college credit for the course and the failing mark will not appear on the student's permanent college record.

   c. grades and credits earned will be transferred to the student's permanent college record only upon his request.

4. I will be communicating with your (son's) high school teachers and counselors frequently so that we will know how (his) high school work is coming along and the high school will know how (his) college work is proceeding.

We hope that this program will be a success, both from the "experimental" point of view as well as from your (son's) personal and professional point of view. If you have any questions about this program or would like to discuss it in further detail, I would be very happy to talk with you personally. My office phone is MI 6-4843, Extension 251; my home phone is MI 5-3066. My office address is Hamline University, St. Paul 1, Minnesota; my home address, 862 Holton. We are planning to have a meeting sometime in September for the parents of the students and the teachers at Hamline involved in this program. I will look forward to meeting you at that time.

Thank you for your part in this program and best wishes.

Sincerely,

Olaf A. Runquist, Director
Class Plan

Date

Dear

I have talked to your high school counselor, and find that your schedule has been arranged so that you may attend the college class in (Mathematics 16, 49) at Hamline University this year. Following is some information relevant to your registration and attendance at the first college class.

1 - Books: Your text book(s) may be obtained by picking up a requisition slip at the Hamline University Business Office (first floor of Old Main, see map) and taking this to the Book Store. Your books have already been paid for. You may get your books anytime between now and September 16, or on Monday afternoon, September 19, after you have registered.

2 - Registration: Registration will be at 3:00 p.m., Monday, September 19. We will meet promptly in room 314 of the Science Building. Please bring a pencil or ball point pen with you.

3 - First Class: Your first class will be Wednesday, September 21, from 8:00 to 8:50 a.m. Your class room assignment will be made at registration.

4 - New Student Days: I have enclosed a pamphlet about our New Student Days program at Hamline. You are invited to attend any or all of the meetings listed. Two events which we sincerely hope that you will participate in are the Welcome to Hamline and Coffee at Faculty Homes (page 4 of the pamphlet) both of which are Thursday, September 15. We will meet that evening at Norton Field House (corner of Snelling and Hewitt) at 6:30 p.m. Several upperclassmen (HUGS) will meet with us, and they will help you get to the right places at the right time.

Should you have any questions about the Hamline University Class Plan or your participation in the program, feel free to call me any time at MI 6-4843, ext. 251, or MI 5-3066. I will be looking forward to seeing you again on Thursday, September 15, at 6:30 p.m.

Sincerely,

Olaf Runquist
Associate Professor
Department of Chemistry

b. <u>Their achievement in the "Class Plan" course as compared to a control group composed of regular Hamline University freshmen enrolled in the same course</u>: This achievement was measured by letter grades received and in mathematics, where accomplishment was measured by the sum of numerical grades received in tests and homework assignments, on numerical grades given. Because of the small number of "D" students enrolled in science courses (only three during the three-year period), no attempt was made to relate these students in class quartiles. Because the number of "D" students enrolled in each mathematics class was roughly equal in number to the college control group, we determined quartile ranks for each group based on total points accumulated. To determine if the quality of work of the "D" students, as compared to the college students, varied with time numerical grades and quartile standings were determined for both groups at the end of four grade periods during the academic year. Each grade period was approximately one-half semester in length.

c. <u>The relative values which the "D" students placed on the course and its relation to their high school work</u>: We attempted to get this information by (1) personal interviews, (2) a questionnaire (Form VI) at the end of their "Class Plan" year and (3) two questionnaires (Forms VII and VIII) during and at the end of their first full year of college training.

d. <u>The level of motivation and interest maintained with regard to their original vocational choice (Fall of their "Class Plan" year) and any changes in interest during the year</u>: We attempted to obtain this information by the same means noted in "c" above as well

FORM VI

1. Name _____ 2. High School _____

   Home Address _____ Date of Graduation _____

3. "On Campus" course _____ Teacher _____

4. College in which you plan to enroll _____

5. Course of study _____

6. Do you now intend to use your "On Campus" course for credit toward a college degree?

   6a. If YES, do you plan to take an advanced course in this field or closely related field? Specify courses.

   6b. If NO, why?

7. Do you feel that you could have done better in the "On Campus" course had you waited until you were a regular college student? Why?

8. Evaluate your "On Campus" course under the following headings:

   a. Interest in the subject:

   b. Interest in college:

   c. Personal value:

9. Evaluate your senior year in comparison to your junior year and (or) what your senior year would have been like had you not enrolled in the "On Campus" course under the headings:

   a. Extracurricular activities (including student government):

   b. Social activities (both formal and informal):

   c. Interest in high school subjects:

   d. General high school interest and spirit:

10. In the following space please make criticism of or comments on the "On Campus Class Plan" which you have not made in the preceding questions.

Dear

This is the first of what I suppose will be a long line of "follow up" letters on our Hamline University Class Plan Experiment in which you participated last year. At this time I am interested in:

1. Course titles, credit hours and grades for your first quarter or semester of college.

2. What you now intend to major in.

3. Your critical comments on the strength or weakness of the Hamline University Class Plan as you see it now. What I'm after here is: Was the Class Plan an advantage or disadvantage (or neutral) in your first quarter or semester of college?

I hope this finds you in good spirits, working hard and having a stimulating and rewarding year. Thanks for your speedy reply.

Sincerely,

Olaf A. Runquist, Director
Class Plan

FORM VIII

This well may be the last questionnaire you will need to fill out for me. Please be very explicit in all of your answers and return them to me as soon as possible. Thanks for all your help and best wishes to you in your work.

1. Name:

2. College or University enrolled in:

3. Are your Hamline University Class Plan course credits now on your permanent college record?

4. List the courses, semester (or quarter, indicate which) credits, and grades (A,B,C, etc.) you received for each course you enrolled in this academic year.

5. Of the above courses, which one(s) required your Hamline University Class Plan course as a prerequisite?

6. What was your vocational choice while in High School (fall of your senior year)?

7. What was your vocational choice when entering college last fall?

8. What is your vocational choice now?

9. If your vocational choice has changed during the last two years, indicate why. Be as specific as you can.

10. If you have used your Class Plan course toward your college degree, how will it be of assistance to you, i.e., will you take a lighter academic load while at college, take more courses in major area, take two majors, take more courses in non-major areas, graduate sooner, etc. BE SPECIFIC.

11. What are your plans for the fall of 1962?

as a questionnaire (Form IX) sent to each "D" student in February or March of his "Class Plan" year.

e. The number using "Class Plan" course credits toward college degrees: This information was obtained from questionnaires (VIII) returned by students after their first full year in college.

C. Reports to Teachers and Counselors:

A yearly report was sent to all "D" teachers, the counselors and principals of those schools participating in the Developmental program. This report was also sent to the Foundation Consultant and the Executive Director of the Hill Family Foundation. Copies of the yearly report were sent with each transcript of credit for use by the registrar and college counselor at the college in which the "D" student enrolled.

At each mid-term and final grade period "D" teachers, counselors and principals were informed as to the progress of the students from their respective schools. (Students received their grades directly from the Registrar's Office.) A complete list of grades was sent to the Foundation Consultant and the Executive Director of the Hill Family Foundation at each mid-term and final grade period.

Once each year a dinner meeting was held at Hamline to which high school teachers, counselors and principals were invited along with the staff of the science division at Hamline University. The purpose of these meetings was to review the progress of the program, to make critical analysis and to ask and answer questions.

Many informal discussions were held between the "Class Plan" director and high school teachers and counselors for the purpose of solving the several special problems which arose during the three years.

HAMLINE UNIVERSITY
ON-CAMPUS PLAN

1. Name _____

2. High School _____

3. Vocational Interest 1st _____

2nd _____

3rd _____

4. Are you intending to go to college? _____

5. Have you made formal application for college? _____

6. Where?

7. If you have not yet made application, where do you intend to apply?

8. Will you need financial assistance (other than from home) for your college education? _____

8a. If so, how much assistance? Total _____

50% or more _____

50% or less _____

9. Are you now considering professional or graduate school after your undergraduate training? _____

D. Class Plan Course Offerings and Staff:

Biology:

General Botany - Two Semesters

An overall view of the plant kingdom with particular emphasis the first semester upon the structure and function of the flowering plants. The second semester includes a survey of the plant kingdom, identification of the spring flora, and the ecology of local plant communities. The second semester must be completed before credit is given for the first semester's work. Four credits per semester.

Chemistry:

General Chemistry - Two Semesters

A study of the general laws of chemistry and of nonmetals, metals, and their compounds. The laboratory of the second semester is devoted to a study of elementary qualitative analysis of metallic ions. Three lectures, one recitation, and one three-hour laboratory each week. Second semester must be completed before credit will be given for the first semester's work. Prerequisite, one year of high school algebra. Four credits per semester.

Earth Science:

Astronomy - One Semester (Fall)

The nature of the cosmic universe in which man lives. An attempt is made to integrate some of the basic concepts of physics with the development of astronomy. Three lectures and one laboratory-recitation per week. Four credits.

Geology - One Semester (Spring)

A study of the materials of the earth, geological processes, and the history of the earth as recorded in the rocks. Three lectures and one two-hour laboratory per week. One-day field trip required. Four credits.

Mathematics:

Elementary Mathematical Analysis - Two Semesters

This course includes college algebra, trigonometry, and an introduction to analytic geometry and calculus. Prerequisite, higher algebra. Five credits per semester.

Physics:

General Physics* - Two Semesters

A standard course in General Physics for students of science and engineering. Mechanics, heat, sound, electricity and magnetism, light. Five lectures and one two-hour laboratory period per week. Prerequisite, Elementary Mathematical Analysis or coregistration. Five credits per semester.

Teaching Personnel

Biology:

Walter A. Kenyon, 1924-

Professor of Biology; B.A., Milton College, 1919; M.A., Wisconsin, 1922; Ph.D., Wisconsin, 1924. Further graduate study, Marine Biological Station, 1924; Puget Sound Biological Station, 1927.

Ruth Sullivan, 1945-

Assistant Professor of Biology; B.S., Hamline, 1929; M.A., Minnesota, 1931.

Bertie L. Hawkins, 1935-

Assistant Professor of Biology; B.S., Hamline, 1930; M.A., Minnesota, 1932.

Harriet M. Kellner, 1958-

Instructor in Biology; B.S., University of Minnesota, Duluth, 1955; M.S., University of Minnesota, 1959.

Chemistry:

Perry A. Moore, 1939-

Professor of Chemistry; B.S., Des Moines University, 1925; M.S., Iowa State, 1926; Ph.D., Iowa State, 1936.

John C. Hayes, 1950-51, 1953-

Associate Professor of Chemistry; A.B., Wabash, 1943; M.S., Vanderbilt, 1944; Ph.D., Vanderbilt, 1955.

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* Because of the Elementary Mathematical Analysis prerequisite in this course, it was available only to the most exceptional high school students who had demonstrated competence in Elementary Mathematical Analysis.

*Olaf Runquist, 1957-

Assistant Professor of Chemistry; B.S., Iowa State, 1952; Ph.D., Minnesota, 1956.

Earth Sciences:

Kent H. Bracewell, 1931-

Professor of Physics; A.B., Illinois College, 1927; M.S., University of Illinois, 1928; Ph.D., Indiana, 1938.

Leland R. Cooper, 1944-

Assistant Professor (Geology); B.A., Wisconsin, 1936; M.A., Minnesota, 1948.

Mathematics:

Walter Fleming, 1957-

Professor of Mathematics; B.A., University of Saskatchewan, 1942; M.A., Minnesota, 1944; Ph.D., Minnesota, 1949.

Gary C. Anderson, 1958-

Instructor in Mathematics; B.S., Concordia, 1956; M.A., University of Nebraska, 1958.

Thomas A. Howitz, 1958-

Instructor in Mathematics; B.S., North Dakota Agricultural College, 1955; M.S., University of North Dakota, 1958.

Dale E. Varberg, 1958-

Assistant Professor of Mathematics; B.S., University of Minnesota, 1954; M.A., University of Minnesota, 1957; Ph.D., University of Minnesota, 1959.

Physics:

Kent H. Bracewell, 1931-

Professor of Physics; A.B., Illinois College, 1927; M.S., University of Illinois, 1928; Ph.D., Indiana, 1938.

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* To serve as Director of Program

PART III

RESULTS AND DISCUSSION

The nine St. Paul Schools participating in the Developmental program recommended a total of sixty-five students for the "Class Plan" program. Of these sixty-five, sixty-two were accepted on the basis of scores and recommendations. Eight of the accepted students were unable to schedule both high school and college classes and were unable to participate. Table I lists the students recommended, accepted and actually participating in the "Class Plan" for the years 1960-63.

Only three students were able to schedule the requisite laboratories for the college science courses. Two boys enrolled in Biology 13-14 and one boy enrolled in Physics 31-32. The rest of the students (51) were enrolled in Mathematics 16-49 (advanced placement section; see page 3 of this report). During the three years, five "D" students dropped from the "Class Plan" program; in all cases academic difficulty was the reason for dropping. One student starting in Mathematics 16 was returned to Mathematics 15 after the first four weeks of classes. Two students did poor work in Mathematics 16 and repeated the course in the spring semester. One student, while doing sufficiently well in Mathematics 16 to continue Mathematics 49, chose to repeat Mathematics 16 in order to obtain a better mark. Table II gives a tabulation of the courses in which the "D" students enrolled and received grades.

The high school ranks, MSAT and ACT scores for the "D" students (averages) are compared to the corresponding scores of the college mathematics control group in Table III. It will be noted that overall, the "D" group has slightly better scores, although the differences of MSAT and SAT

TABLE I

STUDENTS RECOMMENDED FOR THE ON-CAMPUS PLAN

	1960-61	1961-62	1962-63
Central			
	Walter Fohlmeister	Norman Netzman	None
Harding			
	Paul Fonstad[a]	Tom Anderson	None
		Gerald Digre	
		Roger Gebhard	
Humboldt			
	John Longendyke[a]	Sandra Carlson	Jeanne Flipp
		Steven Permuth	David Hozza
		David Ring[a]	
Johnson			
	Sandra Carlson[a]	None	Ronald Peterson[a]
	Teresa Larson[a]		William Watters[a]
Mechanic Arts			
	Roger Giese	Marianne Adelhelm	David Giel
	Michael Hill	Charles Barklind	Robert Hensel[b]
	James Masica	Fred Berndt	Sandra Krummel
	Donald Westerlund	Gail Pichler[a]	Gary Lemke[b]
	Arnis Verteris	Jerry Toensing	Melvin Pavich[b]
			Nicholas Ruiz
			Robert Vogt[c]
Monroe			
	Jacqueline Lander	Diane Bennett	Steven Billing
	Richard Roesler	Judith Burger	(transferred to
	William Grunlow	David Hajicek	Wilson)
Murray			
	Caroline McKay	David Hallen	Louis DeWitt
	Christopher Page	Beth Johnson	JoAnn Kenny
	Daniel Paskewitz	Ronald Kuhn	Gary Kwong
	Elizabeth Perlich[a]	Kathleen Thoennes	
	Lois Poltin		
Washington			
	Terry Anderson	Dennis Senneseth	None
	Lee Bloemendal	Edward Stelberg	
	Wulf Massell		
	David Musolf		
Wilson			
	Maryann Glyer	Ruth Goehle	Richard Bazarnic
	Linda Thoren		Gary Lewis
	Robert Hermstad		Roy Proue

[a] were accepted for program, but could not schedule both high school and college courses.

[b] were recommended, but were not accepted for program on basis of scores.

[c] was accepted for the program for chemistry, biology, astronomy-geology only.

TABLE II

COURSES IN WHICH "D" STUDENTS ENROLLED AND RECEIVED GRADES

1960-61		Course	
Student	High School	First Sem.	Second Sem.
Walter Fohlmeister	Central	Math. 16	Math. 49
Roger Giese	Mechanic Arts	Math. 16	Math. 49
Michael Hill	"	Math. 16	Math. 49
James Masica	"	Math. 16	Math. 49
Donald Westerlund	"	Math. 16	Math. 49
Arnis Venteris	"	Math. 16	Math. 16[c]
Jacqueline Lander	Monroe	Math. 16	Math. 49
Richard Roesler	"	Math. 16	Math. 49
William Grunlow	"	Biol. 13	Biol. 14
Caroline McKay	Murray	Math. 16	Math. 49
Christopher Page	"	Math. 16	Math. 49
Daniel Paskewitz	"	Math. 16	Math. 49
Lois Poltin	"	Math. 16	Math. 49
Terry Anderson	Washington	Math. 16	Math. 49
Lee Bloemendal	"	Math. 16	Math. 49
Wulf Massell	"	Biol. 13	Biol. 14
David Musolf	"	Phys. 31	Phys. 32
Maryann Glyer	Wilson	Math. 16	Math. 49
Linda Thoren	"	Math. 16	Math. 49
Robert Hermstad	"	Math. 16	Math. 49
1961-62			
Norman Netzman	Central	Math. 16	Math. 49
Tom Anderson	Harding	Math. 16	Math. 16[c]
Gerald Digre	Harding	Math. 16	Math. 49
Roger Gebhard	"	Math. 16	Math. 49
Sandra Carlson	Humboldt	Math. 16	Math. 49 (drop)
Steven Permuth	"	Math. 16	Math. 16[b]
Marianne Adelhelm	Mechanic Arts	Math. 16 (drop)	
Charles Barklind	"	Math. 16	Math. 49
Fred Berndt	"	Math. 16	Math. 49
Jerry Toensing	"	Math. 16	Math. 49
Ruth Goehle	Wilson	Math. 16	Math. 49
Diane Bennett	Monroe	Math. 16	Math. 49
Judith Burger	"	Math. 15[a]	Math. 16
David Hajicek	"	Math. 16	Math. 49
David Hallen	Murray	Math. 16	Math. 49
Beth Johnson	"	Math. 16	Math. 49
Ronald Kuhn	"	Math. 16	Math. 49
Kathleen Thoennes	"	Math. 16	Math. 49
Dennis Senneseth	Washington	Math. 16	Math. 49
Edward Stelberg	"	Math. 16	Math. 49

[a] Started in Mathematics 16 but changed to Mathematics 15 after first four weeks of classes.

[b] Student chose to repeat Mathematics 16 even though he received a passing mark in the first semester.

[c] First semester grade did not justify taking Mathematics 49.

1962-63		Course	
Student	High School	First Sem.	Second Sem.
David Hozza	Humboldt	Math. 16	Math. 49
Jeanne Flipp	"	Math. 16	Math. 49
Sandra Krummel	Mechanic Arts	Math. 16 (drop)	
David Giel	"	Math. 16	Math. 49 (drop)
Nicholas Ruiz	"	Math. 16 (drop)	
Steven Billings	Monroe	Math. 16	Math. 49
Louis DeWitt	Murray	Math. 16	Math. 49
JoAnn Kenny	"	Math. 16	Math. 49
Gary Kwong	"	Math. 16	Math. 49
Richard Bazarnic	Wilson	Math. 16	Math. 49
Gary Lewis	"	Math. 16	Math. 49
Roy Proue	"	Math. 16	Math. 49

TABLE III

AVERAGE HIGH SCHOOL RANKS AND SCORES

High School Rank:	1960-61	1961-62	1962-63
D	99	98.2	98.0
College	95	84.0	90.4
MSAT:	**1960-61**	**1961-62**	**1962-63**
D	91	80.4	94.3
College	88	78.2	86.1
ACT: English	**1960-61**	**1961-62**	**1962-63**
D	89	90.3	(77.9-91.6)
College	72	80.5	87.5
ACT: Mathematics	**1960-61**	**1961-62**	**1962-63**
D	93	93.2	(97.2-99.3)
College	92	89.2	92.2
ACT: Science	**1960-61**	**1961-62**	**1962-63**
D	87	91.7	(86.2-96.9)
College	90	86.1	86.1
ACT: Social Science	**1960-61**	**1961-62**	**1962-63**
D	92	85.0	(92.8-97.1)
College	80	86.1	86.8

mathematics and science scores are so slight that no real significance can be placed in these differences. On the basis of these scores, one would predict about equal college performance of the two groups in Mathematics.

In Table IV are listed the grades earned by the "D" groups and the college control groups in the "Class Plan" courses. In the table, the number of students receiving the respective grades is listed along with the percent of each group falling into that grade category. Also listed in the table is the grade point average (A=3.0, B=2.0, C=1.0, D=0) for each group of students for each semester. Students officially dropping from a course before final grades were assigned are not included in the table. The "D" students who took Mathematics 15 or repeated Mathematics 16 are not included.

Several trends seem evident in Table IV and are noteworthy. First, the prediction that the "D" students should do as well as the college students in mathematics seems to be borne out. The percent of students receiving grades of B or better and B or less is roughly the same for each group in each of the years listed, with the notable exception of the 1962-63 class where a much larger percent of college students received grades of B or better. (Note, however, the percent of "D" students receiving A, B grades in this year was comparable to the percent in the preceding two years). The grade point averages for the year also indicate the similarity in competence of these two groups of students.

The second interesting trend is the apparent weakening of the "D" group and strengthening of the college group as each year progressed. This is reflected in both the percent of students receiving B grades or better and in the grade point averages for each semester. As will be indicated later, this weakening of the "D" group and strengthening of the college group seems

TABLE IV

GRADE DISTRIBUTIONS OF THE HIGH SCHOOL AND COLLEGE CONTROL GROUPS[a]

	Mathematics: 1960-61				Mathematics: 1961-62				Mathematics: 1962-63			
	First Semester		Second Semester		First Semester		Second Semester		First Semester		Second Semester	
	"D"	College	"D"	College	"D"	College	"D"	College	"D"	College	"D"	College
A	4(24%)	5(28%)	6(38%)	5(31%)	5(28%)	7(24%)	4(29%)	5(27%)	2(20%)	8(31%)	2(22%)	7(39%)
B	8(47%)	4(22%)	1(6%)	4(25%)	4(22%)	9(31%)	3(20%)	9(39%)	4(40%)	11(42%)	2(22%)	6(33%)
C	4(24%)	7(39%)	8(50%)	6(38%)	7(39%)	7(39%)	7(47%)	7(30%)	4(40%)	5(19%)	2(22%)	4(22%)
D	1(6%)	1(6%)	0	1(6%)	2(11%)	3(10%)	1(4%)	2(9%)	0	2(8%)	2(22%)	1(6%)
F	0	1(6%)	1(6%)	0	0	3(10%)	0	0	0	0	1(11%)	0
GPA	1.88	1.67	1.75	1.81	1.67	1.59	1.67	1.74	1.80	1.96	1.33	2.05
GPA for yr.			1.81	1.74			1.67	1.67			1.61	2.00
% Students B or better	71%	50%	44%	56%	50%	55%	49%	66%	60%	73%	44%	72%
% Students B or better ave. for year			57%	53%			50%	60%			52%	72%

	Physics: 1960-61				Biology: 1960-61			
	First Semester		Second Semester		First Semester		Second Semester	
	"D"	College	"D"	College	"D"	College	"D"	College
A		6(11%)		6(12%)		8(11%)		5(7%)
B		13(23%)		16(31%)		19(25%)		22(30%)
C	1(100%)	25(47%)	1(100%)	19(37%)	2(100%)	41(54%)	2(100%)	34(46%)
D		6(11%)		3(6%)		7(9%)		11(15%)
F		3(6%)		7(14%)		1(1%)		2(3%)
GPA	1.0	1.23	1.0	1.35	1.0	1.36	1.0	1.26

[a] The values in parenthesis are the percent of "D" students or college students receiving grades of A, B, etc. Only students completing the original courses are included in this table.

to have occurred rather abruptly in the last month and a half of the school year. It was during the Spring that many of the "D" students found an increased number of distractions at high school such as senior trips, formals, class days, etc. Several students dropped entire grade points during this period of time.

The third point worthy of consideration is the apparent weakening of the "D" classes in progressing from 1960-61 to 1962-63. This is most readily seen in the yearly grade point averages of the groups which are 1.81, 1.67 and 1.61 for the three years. While a trace of this trend is noted in the high school ranks MSAT and SAT scores of the three classes, a far more important factor seems to have been motivation and interest.

Table V shows a comparison of the average grade points of all the "D" students (mathematics and science) in their college class for each of the three years of the program. Also included in Table V are the average grade points of all students from a particular school in the "Class Plan" courses. Again, only grade points of students actually completing the regular sequence of courses (Biology 13-14, Physics 31-32 or Mathematics 16-49) were included in this table.

TABLE V

AVERAGE GRADE POINT AVERAGE OF ALL "D" STUDENTS IN COLLEGE COURSES BY YEAR AND BY SCHOOLS[a]

	1960-61	1961-62	1962-63
G. P. Average	1.69	1.67	1.58
	G.P. Av.		G.P. Av.
Central	1.75 (2)	Monroe	1.75 (7)
Harding	1.40 (3)	Murray	1.95 (10)
Humboldt	.83 (4)	Washington	1.25 (6)
Mechanic Arts	1.75 (9)	Wilson	1.79 (7)

[a] Grade Point Average (G. P. Av.) is based on A=3, B=2, C=1, D=0 system. Only students completing regular sequence of courses are included in this table.

In order to further compare the "D" and college control groups, the average raw scores which students received on tests and assignments in mathematics were collected. Table VI gives these raw scores for both groups in four grade periods (each grade period is approximately one-half semester) and the percent difference in these average scores. The trend noted earlier of the "D" group weakening as each year progressed is quite evident from the percent differential values.

Table VII shows the quartile distributions of the students in both mathematics groups for the three year period. Two things are noteworthy in this table. First, the similarity of the two groups, percentage wise over the three year period. Secondly, the only significant difference in the two groups appears in the two lower quartiles. It may be seen that as the year progressed (i.e. going from 1st to 4th grade period), the percent of "D" students in the lowest quartile generally increased, while the percent of college students in the lowest quartile generally decreased. It will be noted that the percent of "D" students in the 50-25 percentile generally decreased in the same period of time. The reasons for these trends are that, generally speaking, "D" students in the 50-25 percentile at the beginning of the year did progressively poorer work and moved into the lower quartile, while the college student in the lower quartile did progressively better work and moved into the 50-25 percentile rank. It appeared that "D" students in the lower half of the class gave up or put little effort into their "Class Plan" course soon after the beginning of the second semester. The students in the top half of the class, however, tended to continue their good work, many of them actually doing better work, comparatively, at the end of the year than at the beginning.

TABLE VI

AVERAGE RAW SCORES OF MATHEMATICS STUDENTS FOR YEARS 1960-63 DURING FOUR GRADE PERIODS AND THE PERCENT DIFFERENCE IN AVERAGE SCORES[a]

Grade Period	1960-61 "D"	1960-61 College	1960-61 % Diff.[b]	1961-62 "D"	1961-62 College	1961-62 % Diff.[b]	1962-63 "D"	1962-63 College	1962-63 % Diff.[b]
1st	235	218	-7.5	142	143	.7	206	207	.5
2nd	281	274	-2.5	276	280	1.4	258	275	6.4
3rd	170	180	5.7	133	128	-3.8	101	115	13.0
4th	262	271	3.4	304	318	4.5	211	277	27.0

[a] The total number of points in each grade period was not the same. [b] The percent difference was calculated by (College score - D score) x 100 / Average score.

TABLE VII

DISTRIBUTION OF MATHEMATICS STUDENTS INTO GRADE QUARTILES[a]

Grade Period	Year	100-75%ile "D"	100-75%ile College	75-50%ile "D"	75-50%ile College	50-25%ile "D"	50-25%ile College	25-0%ile "D"	25-0%ile College
1st	1960-61	4(24%)	4(22%)	6(35%)	3(17%)	6(35%)	3(17%)	1(6%)	8(45%)
	1961-62	5(28%)	7(24%)	4(22%)	8(28%)	3(17%)	9(31%)	6(33%)	5(17%)
	1962-63	3(30%)	6(23%)	2(20%)	7(27%)	2(20%)	8(31%)	3(30%)	5(19%)
Average Percent		27%	33%	26%	24%	24%	26%	23%	27%
2nd	1960-61	4(24%)	4(22%)	4(24%)	5(28%)	5(29%)	4(22%)	4(24%)	5(28%)
	1961-62	3(17%)	8(28%)	4(22%)	8(28%)	5(28%)	7(24%)	5(28%)	6(21%)
	1962-63	1(10%)	8(31%)	2(20%)	7(27%)	3(30%)	6(23%)	4(40%)	5(19%)
Average Percent		17%	27%	22%	28%	29%	23%	31%	23%
3rd	1960-61	3(19%)	5(31%)	4(25%)	4(25%)	4(25%)	4(25%)	5(31%)	3(19%)
	1961-62	5(33%)	5(22%)	4(27%)	5(22%)	3(20%)	7(30%)	3(20%)	6(26%)
	1962-63	1(11%)	7(33%)	3(33%)	5(24%)	1(11%)	7(33%)	4(44%)	2(10%)
Average Percent		21%	29%	28%	24%	19%	29%	32%	18%
4th	1960-61	6(38%)	2(13%)	1(6%)	7(44%)	4(25%)	4(25%)	5(31%)	3(19%)
	1961-62	4(27%)	6(26%)	3(20%)	6(26%)	2(13%)	8(35%)	6(40%)	3(13%)
	1962-63	2(22%)	6(29%)	2(22%)	5(24%)	0(0%)	7(33%)	5(56%)	3(14%)
Average Percent		29%	23%	16%	33%	13%	31%	42%	15%

All but one of the students entered college or planned to enter college after graduation from high school. (The one student plans to enter college one year after high school graduation.) Table VIII lists the students completing a year of the "Class Plan" program, the college attending and the intended major field of study as indicated at the end of their "Class Plan" year. The tally of major fields is:

Mathematics	11	Business	2
Science	12	Political Science	2
Engineering	6	Undecided	7
Medical fields	6	Psychology	1

It is interesting to note that 75 percent of the 47 students completing the "Class Plan" year intend to major in some area related to mathematics or science. At the beginning of the "Class Plan" year, 95 percent of the students had intended to go into mathematics or science-related areas. Much of the switching of major fields of interest was directly related to the "Class Plan" course. Many students found that the rigor and abstractness of modern mathematics did not interest them as much as they had expected.

In reply to the questionnaire returned by each student at the end of his "Class Plan" year, the following points are noteworthy:

1. Of the 47 students completing the course, at least 26 (55%) plan to use the course and credit toward a college degree.
2. Fifty percent intend to take an advanced course in their "Class Plan" subject.
3. Forty-eight percent felt they could have done better in the course had they waited until they were a regular college student. The reasons given most frequently were: "I will have more time to study as a college student" or "I will have fewer distractions while a college student." Lack of maturity or lack of background were rarely given as reasons.

TABLE VIII

COLLEGE INTENTIONS OF "D" STUDENTS AT HIGH SCHOOL GRADUATION

1961

Student	College	Major Fields
Walter Fohlmeister	Yale	Astronomy
Roger Giese	Hamline University	Undecided
Michael Hill	College of St. Thomas	Mathematics
James Masica	Hamline University	Mathematics
Donald Westerlund	Hamline University	Mathematics
Arnis Venteris	University of Minnesota	Metallurgy or Chemistry
Jacqueline Lander	University of Minnesota	Chemistry
Richard Roesler	Hamline University	Chemistry
William Grunlow	Macalester	Pre-Dental or Law
Caroline McKay	University of Minnesota	Pre-Medical
Christopher Page	University of Minnesota	Mathematics or Psychology
Daniel Paskewitz	University of Minnesota	Undecided
Lois Poltin	Hamline University	Music - Mathematics
Terry Anderson	Carleton	Undecided
Lee Bloemendol	University of Minnesota	Pre-Medical
Wulf Massell	University of Minnesota	Physics
David Musolf	University of Minnesota	Engineering
Maryann Glyer	Hamline University	Chemistry
Linda Thoren	University of Chicago	Political Science
Robert Hermstad	University of Denver	Engineering

1962

Gerald Digre	University of Minnesota	Pre-Medical
Roger Gebhard	University of Minnesota	Pre-Medical
Tom Anderson	University of Minnesota	Business Administration
Charles Barklind	Macalester	Undecided
Jerry Toensing	University of Minnesota	Mathematics
Fred Berndt	Hamline University	Pre-Medical
David Hajicek	University of Minnesota	Physics or Engineering
Judith Burger	University of Minnesota	Undecided
Dianne Bennett	University of Minnesota	Chemistry
Beth Johnson	University of Minnesota	Mathematics
Ronald Kuhn	University of Minnesota	Engineering
David Hallen	University of Minnesota	Engineering
Kathleen Thoennes	University of Minnesota	Mathematics
Dennis Senneseth	University of N. Dakota	Business
Steven Permuth	University of Minnesota	Chemistry
Ruth Goehle	University of Minnesota	Mathematics
Norman Netzman	University of Minnesota	Mathematics
Edward Stelberg	University of Minnesota	Engineering

1963

Richard Bazarnic	University of Minnesota	Physics
Steven Billings	University of Minnesota	Mathematics-Education
Louis DeWitt	University of Minnesota	Engineering
Jeanne Flipp	Macalester	International Studies
David Hozza	Carleton	Undecided
JoAnn Kenny	University of Minnesota	Chemistry
Gary Kwong	University of Minnesota	Chemistry
Gary Lewis	Ohio Wesleyan	Undecided
Roy Proue	University of Minnesota	Mathematics or Physics

4. Fifty-two percent felt their "Class Plan" course increased their interest in the subject matter field, while 25 percent indicated a marked decrease of interest in the field.
5. Only one student indicated a decreasing interest in college because of the "Class Plan" program.
6. The greatest personal values which students placed on the course were:
   a. "An excellent preview of college life and college classes."
   b. "Improvement of study habits."
   c. "Recognition of limitations within subject matter area."
   Only three students out of 47 indicated negative values and all three indicated that the course had interferred with their high school activities too greatly.
7. Seventy-five percent or more of the students indicated that the "Class Plan" had had no effect on their extracurricular or social activities nor their high school interest or spirit. Sixty-six percent indicated a continuing interest in high school subjects, thirty-four percent had a lowered interest in high school subjects and that at least part of this declining interest was due to "the more challenging college course". Nearly 75 percent of the students made comments on the great discrepancies in the level of achievement expected by teachers in high school and college. Many indicated that the lack of challenging academic standards in high school had led to poor or no study habits.

While there has not yet been time to obtain questionnaires from all participants in the "Class Plan" after they have completed a full year of college work, we have obtained responses from most of the 1960-61 class. We also

have information on the 1961-62 class after their first semester or quarter of college. Table IX is a tabulation of this information.

TABLE IX

REPLY FROM QUESTIONNAIRE RETURNED AFTER FIRST YEAR OF COLLEGE

Class of 1960-61

20 students - 14 answered questionnaire

Number using credit toward college graduation	11 of 14
Overall grade point average at end of first year (3.0 = A) . . .	2.13
Number of those using credit who took advanced course	8 of 11
Grade point average in that advanced course	2.04

Vocational choices at the end of first year of college:

	Number of Students
Science	5
Mathematics	2
Medical	3
Engineering	1
Business	1
Undecided	2

Answers to question:

If you have used your "Class Plan" course toward your college degree, how will it be of assistance to you?

	Number of responses
Allows flexibility and more breadth in college program	4
Allows for a double major	2
Allows for more advanced courses	1
Allows earlier graduation	5
Experience	1

TABLE IX (cont.)

REPLY FROM QUESTIONNAIRE RETURNED AFTER FIRST TERM OF COLLEGE

Class of 1961-62

18 Students - 13 answered questionnaire

Number using credit toward college graduation	6 of 13
Overall grade point average at end of first term (3.0 = A) . . .	2.27
Number of those using credit who took advanced course	4 of 6
Grade point average in that advanced course	2.25

Answer to question:

Was your "Class Plan" course of advantage or disadvantage to you in your first term of college? How was it of advantage?

	Number of responses
Will allow flexibility and more breadth in college program	1
Will allow for a double major	0
Will allow for more advanced courses	2
Will allow for earlier graduation	2
Valuable experience	9

Perhaps the most interesting information in Table IX are the answers to the questions: "If you have used your "Class Plan" course toward your college degree, how will it be of assistance to you?" and "Was your "Class Plan" course of advantage or disadvantage to you in your first term of college?" It would appear from these responses that students are making substantial use of their "Class Plan" courses and that it has generally been of assistance to them in their college training.

PART IV

CONCLUSIONS AND COMMENTS

The purpose of the Hamline University "Class Plan" experiment was threefold: (1) to determine if selected high school students from the Developmental Program could successfully complete a college course in science or mathematics while maintaining other high school activities at a satisfactory level, (2) to determine if such a program would be advantageous to the students in their college work in regard to (a) the number that would use the college credit earned toward a degree, (b) the level of competence the students maintained in the first college class in which the "Class Plan" served as a prerequisite and (c) the level of interest and motivation in science and mathematics which the students generally maintained, (3) to determine the effect of the "Class Plan" on high school students not involved. On the basis of information given in this report and interviews with "Class Plan" teachers and students, the following conclusions seem justified at this time:

1. Selected "12-D" students can participate in and successfully complete a college-level mathematics course which:
   a. is taught at a college campus by regular college teachers
   b. contains (50 percent or more) highly motivated, high ability, regularly matriculated college students
   c. expects college-level achievement of all students

   Of the fifty-two students starting the course, 43% received grades of B or better, 80% of C or better and 20% received grades of D or less or dropped from the program. These people continued to do well in their high school courses.

2. Our records indicate that of the forty-seven students completing a full year of the "Class Plan" program, twenty-six (55%) plan to use the course and credit toward a college degree (i.e., will transfer the course grade and credits to permanent college record). College students taking advanced courses in the subject which the "Class Plan" course was used as a prerequisite have maintained a B or better average in the advanced course. "Class Plan" participants maintained a high motivation for college. Approximately 25% of the participants indicated the course decreased their interest in the subject matter field and many of these people decided that they would not "major" in this subject matter when in college. Approximately half of the participants indicated the "Class Plan" increased their interest in the subject matter field.

3. As far as we could determine, the "Class Plan" had no effect on high school students not participating.

4. At least 80% of the students selected for the "Class Plan" appeared to have adequate backgrounds in subject matter to successfully complete college work. All appeared to have the potential of B work or better. The fact that many of these high ability students with adequate high school training did poor (C or less) work appeared to be due to the following:

   a. lack of motivation for the subject specifically and lack of motivation for intellectual excellence generally,
   b. poor study habits with no real effort or desire to improve them,
   c. an unrealistic concept of the amount of personal effort necessary for maintaining high academic standards, (i.e., insufficient time spent in study outside of class).

Many students indicated that they had received A grades in high school with little work and expected to be able to continue A level work in college with the same effort. Even after a year's course in college a few students felt their poor marks were a result of external factors and not to personal shortcomings.

5. The study habits of at least 75% of the "D" students recommended for the "Class Plan" were not adequate for college work and the transition for these students from the "D" classes to the college class was seemingly as difficult as for "non-D" students of comparable ability. The most notable areas of difficulty in this transition appeared to be:

   a. the level of proficiency required by a college course,

   b. the extent of non-classroom work expected,

   c. the sustained effort necessary to complete a full year of academic work at the college level.

   In this regard we feel the "D" program through the 11th grade has covered sufficient subject matter to enable people to start college-level courses <u>but</u> the "D" program has apparently not required enough of the very able students to cause them to develop "college-level" study habits. Far too many students assumed that attendance at class and a few minutes to "look over the lesson" was sufficient effort on their part.

The Hamline University "Class Plan" experiment has shown that certain highly motivated, well-trained "12-D" high school students are ready for college-level work at college standards in a college classroom with highly motivated, high ability college students as colleagues. This fact is comforting in that the high school "D" mathematics teachers (and perhaps all

"D" teachers) have apparently done a very substantial job of training students in this accelerated course. However, this fact must raise in our minds a more formidable question: <u>If some talented students can be prepared for college-level work by the 12th grade, what are we doing to provide them with college work in the 12th grade -- or are we allowing them to simply mark time for a year</u>? The "Class Plan" experiment sharpens this question, not only because it has proven that some high school students are capable of college-level work, but it has also clearly indicated that there are high school students (and in rather extensive numbers) ready for college-level work <u>NOW</u>. It would seem that the "Class Plan" experiment has value only if it causes us to think and act on the behalf of our talented students.

In order to provide meaningful and useful education for talented students in our public school system, a few essential criteria need to be consistently met:

1. The education should carry them well beyond high school level work.
2. The education should integrate with the advanced work the student will be doing.
3. The education should be of such quality and quantity that the advanced work (i.e., college courses) can build upon this education with confidence. The education should be of such a nature that the student either receives advanced placement and/or credit for the work when he goes to college.
4. The cost of this special education should be such that it can be continued on a long-range basis.

I would like to present four possible ways (none of which are new) of accomplishing these goals and briefly comment on them. It would seem to me that no one of these "programs" is <u>the answer</u> to the educational problems we

face, but perhaps use of all of them as the situations demand will provide our high ability students with a very sound educational program.

Early Entrance to College: Some highly motivated, high ability high school age students are quite capable of enrolling for a full year of college-level academic work. Early entrance to college for these students would fulfill the above-mentioned criteria most adequately. The disadvantage of such a plan for many capable students is, however, that they are not yet emotionally and socially mature enough for college life. There are enough records generally available showing the advantage of early college entrance to the mature, capable student to warrant our consideration of this course of action; there are also enough records available showing the disastrous effects of early college entrance on the immature capable student to warrant our discretion.

Advanced Placement Courses: Many schools throughout the country have established "advanced placement courses" in the high school, taught by well trained, highly competent high school teachers. Students taking the courses take the ETS advanced placement test in the subject matter field and on the basis of scores obtained, be given advanced placement in college, with or without credit. This is a fine program and certainly fulfills the first three criteria listed above. The advanced placement program is not "free" however. The costs include special training for able teachers, high salaries to retain these special, well-trained capable teachers, reduced teaching loads for the advanced placement teacher, additional laboratory equipment, space and time in the laboratory sciences and a considerable increase in library holdings. When school systems and administrations are serious enough about advanced education for talented students to pay these fees, this is an excellent program.

College Courses in High Schools Taught by College Teachers: This program, again, would fulfill the requirements 1-3 providing the college teacher maintains college scholastic levels and can prove to college registrars that the course given is indeed college-level and deserving of college credit and/or advanced placement. The biggest disadvantage of this program is cost. The number of students in any but the largest of high schools ready for and capable of taking a college-level course in any given subject is likely to be fairly small; this means the student-teacher ratio would be low -- very advantageous to students, but costly education.

Class Plan Type Program: This program fulfills the first three criteria, but again is not "free". In order for this type of plan to be feasible on a long-term basis the following would need to be fulfilled: (a) classes at the college would need to be given at a time convenient to high school students (perhaps late afternoon), (b) the program would need to be financed, at least in part, by the high school system and part by parents, (c) colleges would have to be relatively close to the high schools and (d) students participating in such courses must have lighter high school loads. In the Twin City areas, with seven private colleges and the State University available, the "On-Campus" type program has considerable possibilities and warrants important consideration.

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